

Notice of Allowability

Application No.

10/081,782

Applicant(s)

HONDA ET AL.

Examiner

Art Unit

Vikkram Bali

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 9/11/2006.
2. ☒ The allowed claim(s) is/are 3-4, 6-11, 15, 18-19, 22, 24 (renumbered as 1-13).
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying Indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|---|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____ |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

Examiner's Amendment

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with George B. F. Yee, Reg. # 37,478 on 9/27/2006.

The application has been amended as follows:

In claims:

Cancel claim 25 and 26.

Amend claim 24 as follows:

24. A defect inspection apparatus comprising:

electron beam irradiation unit for irradiating an inspection target with an electronic beam focused thereon in a scanning manner;

a detection unit including a pair of narrow angle electron detectors and a non-directional electron detector, the narrow angle electron detectors detecting in narrow angle directions which are different from each other, electrons generated from the inspection target which is irradiated with the electron beam focused by the electron beam irradiation unit;

an imaging unit for imaging a pair of detection signals detected by the pair of

narrow angle electron detectors of the detection unit to produce a pair of perspective images, and for imaging a detection signal detected by the non-directional electron detector to produce a secondary electron image; and

an image processing unit for processing respective images of a defect portion and a reference portion of the inspection target which are imaged through the imaging unit by detecting the defect portion and the reference portion through the detection unit so as to detect a defect position of the inspection target;

wherein the image processing unit calculates a difference image of each of the pair of perspective images of the respective defect and reference portions, and detects the defect position of the inspection target from the calculated respective difference images between the defect and reference portions; and

wherein the image processing unit calculates a difference image concerning the calculated respective difference images between the defect and reference portions, calculates a difference image between the calculated difference image of the defect portion and the calculated difference image of the reference portion, calculates a difference image of the secondary electron image between the defect portion and the reference portion, and detects the defect position of the inspection target from the calculated difference image between the defect portion and reference portion and the calculated difference image of the secondary electron image between the defect portion and the reference portion.

Allowable Subject Matter

2. Claims 3-4, 6-11, 15, 18-19, 22, 24 (renumbered as 1-13) are allowed.

3. The following is an examiner's statement of reasons for allowance:

In dependent claims 3, 15 and 18 and their corresponding dependent claims are allowed because prior art taken alone or in combination fail to disclose, suggest or teach a defect inspecting method that includes mixing two perspective images obtained by picking up an image of the inspection subject region of said sample from each of two opposed directions with a non-directional electron image, thereby synthesizing a first mixed image, mixing two perspective images obtained by picking up an image of the comparison subject region of said sample from each of the two opposed directions with a non-directional electron image, thereby synthesizing a second mixed image; and comparing the first mixed image with the second mixed image, thereby obtaining mis-registration quantities respectively between the two perspective images and the non-directional electron image of the inspection subject region of said sample and the two perspective images and the non-directional electron image of the comparison subject region, in combination to the other limitations of the claim.

In dependent claims 6, 19 and 22 and their corresponding dependent claims are allowed because prior art taken alone or in combination fail to disclose, suggest or teach a defect inspecting method that includes using information of a difference image of two perspective images obtained by picking up an image of the inspection subject region of said sample from each of two opposed directions; and using information of a

Art Unit: 2624

difference image of two perspective images obtained by picking up an image of the comparison subject region from each of two opposed directions, in combination to the other limitations of the claim.

In dependent claim 7 is allowed because prior art taken alone or in combination fail to disclose, suggest or teach a defect inspecting method that includes using obtaining a difference image between a non-directional electron image obtained by picking up an image of the inspection subject region of said sample and a non-directional electron image obtained by picking up an image of the comparison subject region, by using local perturbation; and detecting defects of the inspection subject region by using information of the difference image obtained by using the local perturbation, in combination to the other limitations of the claim.

In dependent claim 9 and its corresponding dependent claims are allowed because prior art taken alone or in combination fail to disclose, suggest or teach a defect inspecting method that includes picking up images of a comparison subject region designed so as to originally have an external appearance identical with that of the inspection subject region of said sample by using said plurality of detectors, thereby obtaining a plurality of external appearance images of the comparison subject region, combining the plurality of external appearance images of the inspection subject region of said sample to form a first synthetic image and combining the plurality of external appearance images of the comparison subject region to form a second synthetic image, obtaining a mis-registration quantity between the formed first synthetic image and the formed second synthetic image, correcting mis-registrations between the plurality of

external appearance images of the inspection subject region of said sample and the plurality of external appearance images of the comparison subject region that respectively correspond to the plurality of external appearance images of the inspection subject region, based on the obtained mis-registration quantity, in combination to the other limitations of the claim.

Claim 24 is allowed because prior art taken alone or in combination fail to disclose, suggest or teach a defect inspecting method that includes an image processing unit calculates a difference image concerning the calculated respective difference images between the defect and reference portions, calculates a difference image between the calculated difference image of the defect portion and the calculated difference image of the reference portion, calculates a difference image of the secondary electron image between the defect portion and the reference portion, and detects the defect position of the inspection target from the calculated difference image between the defect portion and reference portion and the calculated difference image of the secondary electron image between the defect portion and the reference portion, in combination to the other limitations of the claim.

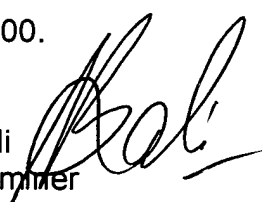
Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vikkram Bali whose telephone number is 571.272.7415. The examiner can normally be reached on 7:00 AM - 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571.272.7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Vikkram Bali
Primary Examiner
Art Unit 2624



vb
September 28, 2006